PROGRESS REPORTS
FROM
EXPERIMENT STATIONS

SEASON 1953-54

QUEENSLAND

PUBLISHED BY
THE EMPIRE COTTON GROWING CORPORATION,
12 CHANTREY HOUSE, ECCLESTON STREET,
LONDON, S.W.1.

1955

COMMONWEALTH MYCOLOGICAL INSTITUTE
18 AUG 1955

PROGRESS REPORTS FROM EXPERIMENT STATIONS.

Back numbers are available as follows:—

1923-25 (one volume)	2s	0d
1926-27, 1931-32, 1934-35, 1935-36 ...	2s	6d per vol.
1942-43 and 1945-46 to 1950-51 ...	3s	0d ,, ,,
1951-52 onwards. Individual Reports		9d each
Set of Reports ...	7s	6d

[*Published by courtesy of the Queensland Government.*]

QUEENSLAND

REGIONAL EXPERIMENT STATION, BILOELA PROGRESS REPORT FOR THE SEASON 1953-54

BY

R. W. PETERS.

Introduction.

This summary has been prepared from the reports submitted by the staff of the Biloela Regional Experiment Station.

Meteorology.

The total rainfall received during the period July 1953-June 1954 was 30·83 inches, compared with the annual mean of 27·86 inches.

The winter was dry, planting rains for autumn and winter growing crops not occurring until an exceptional fall of 2·78 inches was experienced at the end of August.

The spring and summer were favourable for crops, but were marked by several torrential thunderstorms and a severe hail storm on 26th December, which caused surface sealing of the soil and minor flooding in some areas on the Station with consequent uneven moisture penetration and subsequent irregular growth.

The wet season finished abruptly at mid March 1954, with no rain of any consequence until early June.

The maximum and minimum temperatures recorded during the year remained close to the average of previous years, both being only slightly above normal. Monthly means fluctuated from previous means, however, with the mean minimum temperatures being well below the average for July and August, and well above for February.

The first frost occurred on 6th June, but killing frosts were not experienced until 10-15th June. The monthly climatological data are presented in Table 1.

Table 1.

Month	*Rainfall in inches*		*Screen Maximum Temperature (°F)*		*Screen Minimum Temperature (°F)*	
	1953-54	1925-54 *Means*	1953-54	1925-54 *Means*	1953-54	1925-54 *Means*
July, 1953	—	1·28	74·6	71·0	35·7	40·0
August	3·29	0·61	83·5	74·3	28·9	41·6
September	—	0·98	80·5	80·3	46·2	46·3
October	2·54	2·02	88·2	85·3	56·5	54·9
November	4·57	2·94	89·7	88·8	61·1	60·6
December	6·02	3·39	93·7	90·7	66·0	64·3
January, 1954	2·02	4·20	87·9	91·5	67·9	66·9
February	8·15	4·85	86·5	89·0	71·2	66·3
March	2·40	2·74	88·9	87·6	65·3	62·9
April	0·64	1·62	84·2	83·0	58·7	54·7
May	0·35	1·59	77·9	77·0	48·7	47·1
June	0·85	1·64	71·1	71·3	44·3	42·9
Total or Average	30·83	27·86	83·9	82·48	54·2	54·04

Crop Growth.

Irrigated plantings of cotton commenced on 22nd October, and good rains towards the end of the month made it possible to complete between 30th October and 9th November the whole of the cotton planting programme. Satisfactory germinations were obtained in all plantings. Early growth was satisfactory except for a short retarding effect on the plants following a severe thrips attack. Unusually high temperatures following the excellent rain at the end of November and early December forced growth of all cotton crops and thinning was carried out during the fine weather which prevailed from 3rd to 25th December. A severe hail storm on 26th December caused damage to the southern end of the Station and plants affected took some weeks to recover their vigour.

Ample rainfall at the end of December and early January ensured continued satisfactory growth. Much of this rain, however, was torrential, causing run-off with consequent lack of penetration resulting in some stunting of plants. Irrigated cotton, on the other hand, showed the benefit of the September irrigation prior to planting and continued to develop a satisfactory bottom crop of bolls. Towards the end of January a 3-inch irrigation was necessary to prevent the appearance of stress conditions.

From the middle of February, following 8 inches of rain, growth was made in all cotton areas, particularly in those which had been retarded earlier and a fair amount of flowering took place.

Hand picking commenced on 17th March and mechanical harvesting in April. Favourable climatic conditions prevailed during harvesting.

Table 2.

Crop	*Planting Dates*	*Picking Dates*	*Local Close Season*	*Rainfall 1.7.53-30.6.54*	*Mean Yield Lint/acre*
Raingrown cotton	Oct. 30th-Nov. 9th	Mar. 29th-July 1st	Nil	30·83″	309 lb.
Irrigated cotton	Oct. 20th-Nov. 1st	Mar. 24th-July 17th	Nil	30·83″+ 6″ irrig.	422 lb.

The total area of cotton at the Station was 47·40 acres, of which 12·64 acres were irrigated and 34·76 acres were non-irrigated—the mean yield of lint per acre being 340 lb., with an average lint percentage of 37·5.

Pests.

Towards the end of November following a period of 17 hot dry days, a severe attack of thrips and aphis caused malformation to the young leaves. A heavy storm yielding 1·91 inches of rain so decreased the population of these pests that spraying became unnecessary. The appearance of corn ear worm moths, which subsequently laid a considerable number of eggs during the first week in December, made spraying of the whole of the cotton crop on the Station necessary. This operation was carried out on 10th and 11th December using an 0·4% DDT solution. Another general spraying was necessary on 15th and 16th January owing to the presence of corn ear worm and rough bollworm.

Cotton crops were not attacked to any extent during February, which was fortunate, owing to the amount of rain that fell between 1st and 27th, 8·15 inches, and from that month on only the usual stainers were present.

With the exception of the two heavy layings of corn ear worm eggs and a fair amount of damage from rough bollworm, the incidence of insect pests was about normal.

Agronomic Trials.

Cotton Thinning Trials.

The high cost and scarcity of rural labour in recent years in Queensland has resulted in considerable mechanisation in crop growing. In the production of cotton, next to picking, hand thinning is the most expensive item.

It has been shown that, providing an even and moderately thick stand of plants is obtained, with temporary modifications of tine spacing, the combine, spring tine cultivator, and scarifier are all suitable for thinning young cotton by cross cultivations as well as for interrow cultivations. However, cross cultivation leaves a series of

clumps of plants rather than a continuous row of evenly spaced single plants.

An experiment was therefore designed for the 1952-53 season to determine whether hand picking of surplus plants from the clumps left after cross cultivation would give an increased yield over cross cultivation alone.

Planting was carried out on 14th October, 1952, using 25 lb. seed per acre. A good thick even stand was obtained. Early growth was good and the whole area was cross thinned on 11th November, when the plants were approximately 9 inches tall. Hand thinning of surplus plants (Treatment A) was carried out after the uprooted plants had wilted. The test which was harvested mechanically produced the yields included in Table 3.

TABLE 3.

Treatment	*Yield in lb. seed cotton per plot*						
	Block 1	*Block 2*	*Block 3*	*Block 4*	*Block 5*	*Total*	*Means lb./ acre*
A. Cross cultivation +hand thinning	776·0	769·0	741·5	773·5	795·5	3855·5	1586
B. Cross cultivation	813·5	729·5	743·5	755·5	797·5	3839·5	1580
Totals	1589·5	1498·5	1485·0	1529·0	1593·0	7695	1583

The results do not indicate any increase in yield from hand thinning.

For the 1953-54 season, a trial was designed to test these methods again, and to compare them also with complete hand thinning and no thinning.

The layout of the experiment was a 4 × 5 longfaced experiment randomised in pairs within the blocks for ease in applying cross cultivation treatments.

Planting was carried out on 4th November, at the rate of 20 lb./ acre, and a good thick stand was obtained. Growing conditions were good except for a dry period in December-January. The various thinning treatments were applied according to plan on 8th December, when the plants were 9 inches tall.

A comparison of thinning costs is presented in Table 4, calculated on the basis of:—labour, 6/- per man hour; machinery, tractor and cross cultivation equipment 10/- per hour.

TABLE 4.

Treatment	*Man Hours/ acre*	*Tractor Rate hrs./acre*	*Cost per acre*
A. Cross cultivation	½	½	8/-
B. Cross cultivation +Hand thinning	½ 4	½	32/-
C. Hand thinning	8	–	48/-
D. Unthinned	–	–	Nil

The first picking was carried out between 11th and 14th May, and the second picking on 17th June. The total yields obtained are shown in Table 5.

TABLE 5.

Treatment	*Yield in lb./acre*		*Sig. exceeds*	
	Seed Cotton	*Lint*	*5% level*	*1% level*
C. Hand thinning	825·6	305·5	A, B, D	A, B, D
A. Cross cultivation	664·6	245·9	D	
B. Cross cultivation +Hand thinning	593·2	219·5		
D. Unthinned	561·2	207·6		
Mean	661·2	244·6		

Basing the value of the cotton crop at the guaranteed price of 14d. per pound, less 4d. per pound harvesting, baling, cartage and other incidentals, Table 6 shows the net values of the treatments.

TABLE 6.

Treatment	*Value per acre of increased yield*	*Cost per acre of thinning*	*Net cash increase or loss*
C. Hand thinning	220/-	48/-	172/- gain
A. Cross cultivation	85/10	8/-	77/10 gain
B. Cross cultivation +Hand thinning	26/8	32/-	5/4 loss
D. Unthinned	—	—	—

Yield comparisons definitely favour hand thinning over all other methods and hand thinning after cross cultivation appears to have no merit.

Time of Watering Trial.

This trial was based on a 3 × 6 randomised block using the following treatments:—A and C, preplanting and January irrigation; E, conditioning, preplanting and January irrigation. Planting was carried out on 30th October and a good stand of seedlings was obtained.

E treatments received a 3-inch irrigation on October 9th and a 1½ inch preplanting watering was given to the whole area on 23rd and 24th October, but because of the late October rain that followed it was not possible to plant until the end of October. Moisture at field capacity was present in the soil to the following depths on 12th November:—E plots, 65 inches; A and C plots, 46 inches.

Growth throughout November and early December was good although some thrips damage was noted late in the month. Mechanical cross cultivation was carried out on 24th November, followed by hand thinning.

Squaring commenced on 4th December, and flowers appeared at the end of the month. At that date no differences could be noticed between the three treatments. At this stage terminal loss averaged 12·2% per 100 foot row.

Following 6 inches of rain in December, plants became fairly vegetative but very healthy until the third week in January when all plots showed signs of stress. A 3-inch irrigation was applied on 28th-29th January.

Flower counts per week per 100 row feet are shown in Table 7.

TABLE 7.

Week ending	*Treatments*		
	A	*C*	*E*
4 weeks in January	937	979	988
5th February	232	234	229
12th February	100	102	98
19th February	127	125	127
26th February	84	71	67
5th March	27	39	32
Total 9 weeks	1507	1550	1541

Observations taken on 11th March showed no noticeable differences between treatments. At that date flowering had virtually ceased and boll formation was moderately good in all plots. A first picking was made by hand over the period 24th to 30th March and a final picking between 2nd and 12th June, the yields being shown in Table 8.

TABLE 8.

Treatment	*First Pick*	*Second Pick*	*Total Yield per acre*
A	729	557	1286
C	794	606	1400
E	731	624	1355
Mean	751	596	1347

Irrigation Rotation Experiment.

This trial was again based on a 5 × 4 randomised block design. The rotation during the season under review was:—

Treatment A. Grass following short fallow after grass. Irrigated.
„ B. Cotton following short fallow after sorghum. Irrigated.
„ C. Cotton following short fallow after cotton. Irrigated.
„ R. Grass following short fallow after grass. Unwatered.
„ S. Cotton following short fallow after sorghum. Unwatered.

A, B and C plots received a 3-inch preplanting watering on 19th-20th October; B and C plots were planted to Miller 41S on 23rd October, and S plots on 9th November. Soil moisture at field capacity was present on 12th November to the following depths in inches:— B plots 60; C plots 38; S plots (dryland) 27.

Germination was poor in B and C irrigated cotton owing to waterlogging in low patches.

Early in December, B and C plots were 12 inches high and healthy except where waterlogging had occurred. The later dryland S plots were 6 inches high and healthy. Signs of stress were evident in B and C plots before rain fell on 26th December. During January, growth in B and C plots was disappointing and flower counts low, caused by extensive waterlogging. S plots, cotton, fallow, sorghum (dryland), grew steadily throughout the month. By the end of February, B and C plots had virtually ceased flowering and only a mediocre crop of bolls had formed which opened rapidly. S plots flowered well during the month and by the end of March had set a good crop of bolls. Flower counts per week per 100 ft. row are shown in Table 9.

Table 9.

Week ending	*Irrigated*		*Dryland*
	B Plots	*C Plots*	*S Plots*
Total to end of February	865 (7 weeks)	627 (7 weeks)	786 (5 weeks)
5th March	30	32	94
12th March	—	—	200
19th March	—	—	148
26th March	—	—	103
Total	895 (8 weeks)	659 (8 weeks)	1331 (9 weeks)

The first hand picking was carried out in B and C treatments on 22nd and 23rd March and the second picking during the period 24th to 27th May. The first and only picking of S plots was made at the same time. The yields are shown in Table 10.

Table 10.

Treatment	*First Pick*	*Second Pick*	*Total—lb. S/c per acre*
B	316	427	743
C	316	356	672
S	1034	—	1034
Mean			816

The low yields of the B and C irrigated plots compared with the S unwatered were undoubtedly due to waterlogging and the subsequent growth of barnyard millet.

In the A grass irrigated plots and R grass unwatered, A plots received a 3-inch irrigation on 19th and 20th October and by 27th a good growth had started in these plots, which were darker green in colour than the R unwatered plots.

By 17th November A plots were pale green but healthy, while R plots were pale green and wilted, but rain later in November invigorated all plots. By early December all plots were tall and beginning to head. Dry weather restricted growth until late December and by the end of the first week in January the green panic grass was heading well, plants being 3-5 feet in height. Seed was harvested on 24th January.

Irrigated Cotton Varietal Trial.

This trial consisted of an 8 × 5 randomised block planted on 9th November on land in the 5th year of cotton, there being 54 inches of subsoil moisture at field capacity. A preplanting irrigation was given during the first week of October but no further supplementary irrigation was given; one was intended during the period of stress but heavy rain fell at the beginning of February.

Growth was slow during the last half of November until rain at the end of the month and in December promoted rapid growth. Thinning was carried out on 11th December. During January this rate of growth steadied but increased in February following the heavy rain. A secondary growth developed. Squaring commenced during the middle of December. The first flowers appeared in early January but the main flowering period was February. Some shedding of squares and young bolls occurred during the very wet periods.

Table 11 shows the number of flowers per 100 ft. row length per week.

TABLE 11.

Week Ending	*A Miller 41S*	*B Miller 43.9.0*	*C D & Pl. 14*	*D Empire*	*E Hibred*	*F Rogers Acala*	*G Coker 100*	*H Stone-ville 2B*
19.2.54	142	132	215	201	211	148	228	136
26.2.54	254	220	352	198	282	207	226	220
4.3.54	225	213	322	189	245	206	253	219
11.3.54	216	194	259	152	235	183	226	213
18.3.54	232	193	198	117	229	144	209	195
25.3.54	103	69	114	61	97	79	67	101
6 weeks total	1172	1021	1460	918	1299	967	1209	1084

From visual observations at flowering time and later when bolls opened, it was obvious that there was very little bottom crop and the middle and top crops formed most of the yield. Stand and terminal counts were taken on 8th January, the mean being 105 plants per 100 foot row with a mean loss of 23·6% of terminals.

Bolls commenced opening early in March but the main crop opened during April, and the first hand picking was carried out from 21st April until 5th May; the second picking was effective between 6th and 16th June.

Table 12 summarises the yields obtained.

Table 12.

Variety	*First Pick*	*Second Pick*	*Total Yield S/C*	*Total Yield Lint per acre*	*Exceeds Final Yield S/C per acre*	
					1%	5%
1. Coker 100	786	310	1096	422	5-8	4-8
2. Stoneville 2B	641	391	1031	381		6-8
3. D & Pl. 14	556	400	956	387		
4. Empire	699	193	892	333		
5. Hibred	605	265	870	361		
6. Miller 41S	490	372	862	312		
7. Rogers Acala	540	312	853	315		
8. Miller 43.9.0	461	359	820	305		
Means	597	325	923			

The yields are disappointing and the comparative failure of two standard Millers 41S and 43.9.0 is difficult to account for.

There was sufficient rain throughout the season except for one dry period in January, and even then the rain fell before irrigation could be given. Crop growth was satisfactory, although long periods of heavy rain caused temporary waterlogging.

Dryland Varietal Trial.

This trial was planted to a 10 × 4 randomised block on second year cotton land following 4 years Rhodes grass. It was planted on 31st October following a planting rain of 2·20 inches recorded between 25th and 27th October.

Relatively good stands were obtained in all varieties. At planting, moisture at field capacity was present in the soil to a depth of 18 inches. Above average monthly rainfall was recorded during November, December and February, but much of these summer rains was received in high intensity storms and was of limited benefit to the crop.

In the north of the two tiers of blocks, the soil type is poor and the permeability low, and a large portion of the summer rainfall was lost in run-off. For this reason severe stress periods were experienced in this north tier with resultant poorer yields. No serious moisture lack was experienced in the south tier during crop growth.

The trial was hand thinned on 3rd and 10th December and stand and terminal counts were taken on 22nd December. Stand counts averaged 84 per 100 row feet. Terminal loss counts taken at the end of December averaged 17·5%, but at the first week in July 1954 the average had risen to 65·8%, caused by insect activity during the main growing period.

Early flowering commenced during the second week in December. Corn ear worm and rough bollworm caused severe square damage during December, January and March. The heavy rains in early February promoted new growth followed by heavy squaring, particularly in the northern tier. This burst of late squaring was responsible for the relative good yields in the second picking from the northern tier.

Flowering commenced late in December in the early maturing varieties Empire, Ca122 and Locket, but during January was generally low. The main flowering period was from mid February to late March. Flower counts taken on equal areas over a 13 week period, showed Empire leading with 1,954 and New Mexico Acala the lowest, 1,082, the mean being 1,398.

Dry weather during April assisted boll opening and by the end of the month there was an appreciable amount of cotton open in all varieties. The first hand picking was carried out from 5th to 11th May, the second picking from 17th to 21st June; the combined yields are shown in Table 13.

TABLE 13.

	Overall Yields				*Tier Yields*					
	Seed Cotton lb. per acre				*Southern*			*Northern*		
Variety	*First pick*	*Second pick*	*Total pick*	*Total pick Lint*	*First*	*Second*	*Total*	*First*	*Second*	*Total*
Empire	551	275	826	298	556	227	783	546	324	870
Miller 610	529	292	821	312	670	324	994	389	259	648
Locket	586	229	815	316	740	286	1026	432	173	605
Miller 43.9 0.	527	248	775	292	643	254	897	410	243	653
Ca 122	567	192	759	286	702	232	934	432	151	583
Rogers Acala	510	229	739	274	675	265	940	346	194	540
Miller 41S	510	224	734	269	670	248	918	351	200	551
MBC 8 10.0 2.	432	278	710	281	508	319	827	356	238	594
N.M Acala	478	216	694	266	589	265	854	367	167	534
Hibred	405	219	624	252	535	211	746	275	227	502
Means	510	240	750	285	629	263	892	390	218	608

The final results in this trial have been affected by the marked differences in yield between the northern and southern tiers, particularly in the first picking. The performance of Empire is noteworthy, however, as it had the highest overall yield and was the only variety to have a higher final yield in the north than in the south. Locket also yielded well, having the highest yield in lint per acre.

Dryland versus Irrigated Cotton.

This experiment was established in the 1952-53 season to compare dryland and irrigated cotton on land following three years Rhodes grass. The field layout was single blocks of 5 rows each and the irrigation time-table for the irrigated blocks was similar to treatment E in the time of watering experiment.

Planting was carried out on October 14th under good conditions and good stands were obtained in both treatments.

In an excellent season the irrigated cotton received 3 inches of preplanting irrigation and a further 3-inch irrigation after the middle of January, in addition to nearly 24 inches of rain from planting to the end of March. A low supply of nitrate-nitrogen was present at planting, especially in the irrigated blocks, and later during December and February, which retarded the growth of the plants. The irrigated cotton flowered and the bolls opened earlier than with the dryland cotton. Both treatments yielded well.

In the 1953-54 season a 3-inch irrigation was given on 29th September, and a subsequent 1-inch irrigation on 20th October to allow planting. Planting of the dryland area was delayed until 31st October following suitable rain. Subsoil moistures taken on 11th November showed that the irrigated soil was wet to field capacity to 26 inches as compared with only 15 inches in the dryland area. An excellent strike was obtained in both areas.

Following excellent early growth, squaring commenced in irrigated cotton at the beginning of December, and in dryland cotton a week later. General flowering commenced under irrigation at the beginning of January, but in the dryland cotton it was 3-4 weeks later, and much later in Miller 41S, which showed better flowering until the middle of February. As in 1952-53, a heavy rain group divided flowering into the two groups. Table 14 shows the flowering in the two treatments with the three varieties in each, separated into the total number of flowers per 100 feet of row during January and up to the 3rd February, and the total number of flowers during the second half of February and during March.

Table 14.

	Dryland			*Irrigated*		
	Miller 41S	*Empire*	*D & Pl. 14*	*Miller 41S*	*Empire*	*D & Pl. 14*
Before Feb. rain	81	569	474	564	1026	1445
After Feb. rain	1645	1422	1758	1168	843	952
Total	1726	1991	2232	1732	1869	2397
Grand Total		5949			5998	

In mid January, shedding of small bolls occurred under irrigation (there being few to lose in the dryland area at that stage), owing it is thought to insect damage and physiological causes resulting from cool temperatures and possibly moisture shortage in the surface layers of soil. Soil moisture determinations in this area showed that the cotton had utilised the moisture in the top 15 inches of soil but moisture remained below that level.

The cotton was hand picked, three pickings being possible in the irrigated areas, but only two in the dryland cotton. The first picking was carried out from 5th to 14th April, the second at the end of May, and the third at the beginning of July (irrigated only).

Table 15 presents the yields obtained for the two years of establishment of this experiment, in seed cotton per acre.

Table 15.

Year	*Variety*	*Dryland lb.S/c./acre*	*Irrigated lb.S/c./acre*	*Means*
1952-53	Miller 41S	1523	1245	1384
	Empire	1624	1664	1644
	Acala 4.42	1272	955	1113
	Means	1473	1288	—
1953-54	Miller 41S	1104	1379	1241
	Empire	1052	1431	1241
	D & Pl. 14	1169	1590	1379
	Means	1108	1466	—

The significant feature of the 1952-53 season, which was ideal for cotton, is that the dryland area yielded more cotton than the irrigated, except in the case of the early maturing variety Empire.

In the 1953-54 season, under good conditions of rainfall, almost comparable with those in 1952-53, yields in the dryland area were over 300 lb. seed cotton per acre less, possibly due to differences in the soil moisture reserve. Under irrigation, however, yields were better than in 1952-53. As in 1952-53, the irrigated cotton was shorter in height and earlier in flowering and boll opening than the dryland.

Cotton Following Soybeans.

In the 1952-53 season, under dryland conditions, the remarkable yield of 2,311 pounds of seed cotton per acre was produced by MBC (Miller Back Cross) strains of cotton when the main dryland yield of Miller cotton for the Station averaged 1,530 lb. This crop was grown on land following a crop of soybeans.

In order to determine whether these results could be repeated, a planting of MBC strains was made in the 1953-54 season, again following a crop of soybeans. The yield on this occasion was 1,482 lb. of seed cotton per acre, compared with an estimated mean for non-irrigated cotton grown on the Station this season of not more than 1,000 lb. per acre.

In view of these results the experiment will be continued in the 1954-55 season, using a standard commercial variety in addition to MBC strains. The possibility is also being investigated that as a result of inefficient nodulation, the soybeans depleted nitrogen supplies sufficiently to retard nitrification early in the growth of the following cotton crops.

Mechanical Harvesting.

Irrigated Cotton Mechanical Harvester Trial.

This trial contained eleven varieties in single blocks, each block containing twelve 42 inch spaced rows, 305 feet long. The land had been cropped with sorghum in the 1952-53 season. A 3-inch irrigation was given on the 12th and 13th October and a 1-inch preplanting irrigation was given on the 21st October. Planting followed on the 24th followed by good natural rain.

The first picking was carried out with the I.H.C. machine on 5th April. Quite a number of green bolls were stripped from bushes during harvesting operations and broken green leaf was evident in the seed cotton harvested. The efficiency of picking was generally poor, especially so in the variety Hibred.

The second and final picking was carried out on 29th June.

Table 16 sets out yields and gleanings with the resultant picking efficiencies.

Table 16.

Variety	*Lost on ground*		*Left on Bushes after Second Pick*	*Total Loss due to Machine*	*Total Yield lb. S/c.*	*Total Yield lb. Lint*	*Potential Yield S/c. lb.*	*Efficiency*
	First Pick X	*Second Pick Y*	*Z*	*XYZ*	*p.a.*	*p.a.*	*p.a.*	*%*
Coker 100	72	111	123	306	1576	629	1882	83·7
Miller 43.9.0	59	98	170	327	1385	512	1712	80·9
D & Pl. 14	31	131	153	315	1307	555	1622	80·6
N M. Acala	49	111	138	298	1266	486	1564	80·9
Miller 610	62	156	159	377	1248	468	1625	76·8
Miller 41S	93	80	192	365	1228	451	1593	77·1
Empire	36	144	163	343	1115	428	1458	76·5
Locket	31	127	185	343	1095	424	1438	76·1
Rogers Acala	41	90	153	284	1071	413	1355	79·0
Hibred	51	198	283	532	702	287	1240	56·9
Acala 5675	15	68	100	183	485	192	668	72·6
Mean	49·1	119·5	165·4	333·9	1134	441	1469	76·5

Discussion.—The generally poor efficiency was the result of large leafy plants. In general these figures tend to suggest that high efficiency of mechanical picking with a spindle machine is associated with high yields.

Evaluation of three years' work indicates that Miller 43.9.0 and Coker 100 are among the most suitable varieties for mechanical harvesting and that New Mexico Acala and Acala 4.42 are quite good. The structure of the cotton bush, the amount of cotton on the bush, the condition of the spindles in the machine and the capabilities of the operator are important factors in obtaining high mechanical harvesting efficiency.

Dryland Cotton Mechanical Harvester Trial.

The experiment consisted of twenty $3\frac{1}{2}$ ft. spaced row plots each of 5 varieties, the area having been cropped to sorghum in the 1952-53 season.

The trial was planted on 31st October and 2nd November but was interrupted on 31st by a storm yielding 0·78 inches after approximately two-thirds of the area had been planted. In all, 2.98 inches of planting rain were received, 2·20 inches being recorded between 25th and 27th October. Relatively good stands were obtained in all varieties except Miller 610, in which the stand was somewhat sparse.

The rate of flowering declined rapidly early in March, although squaring was still fairly good, particularly in the later varieties. A storm yielding 1·47 inches of rain on 16th March was of great benefit to the later crop.

The trial was machine harvested on 7th April with the second and final picking on 1st July. The overall yields and efficiencies obtained in this trial are shown in Table 17.

TABLE 17.

Variety	*Lost on ground*		*Left on Bushes after Second Pick*	*Total Loss due to Machine*	*Total Yield S/c.*	*Total Yield Lint*	*Potential Yield S/c.*	*Efficiency*
	First Pick	*Second Pick*						
	X	*Y*	*Z*	*XYZ*	*p.a.*	*p.a.*	*p.a.*	%
Miller 418	26	44	125	195	1037	391	1232	84·2
Miller 43.9.0	21	33	77	131	1119	432	1250	89·5
Miller 610	31	58	134	223	1201	473	1424	84·3
Empire	29	28	105	162	1007	392	1169	86·1
Hybred	18	46	200	264	634	265	898	70·6
Means	25	42	128	195	1000	391	1195	83·7

The cotton produced in this trial during the season could be considered ideal for mechanical harvesting, and the efficiency of the machine in the four leading varieties was satisfactory.

It appears from the results obtained in this season's trial, and in previous years, that the maximum overall efficiency that can be expected from this type of machine would be from 85% to 90% in non-defoliated cotton.

Mechanical harvesting is now becoming an important aspect of cotton growing in Queensland, and potential yield is consequently not the decisive factor in the assessment of varietal performance. Suitability of plant type and boll type for machine harvesting even with defoliation, and particularly the type of fibre which is least affected by mechanical harvesting, play a very important part in the varietal position. Miller 41S and 43.9.0, which are grown most extensively throughout the State, have a hard bodied fibre which is sufficiently resilient to withstand the twisting action of the spindles, and which consequently gins up better than the fibre of most other varieties after machine harvesting. Consequently, although Empire, Coker 100, New Mexico Acala and D & Pl.14 may materially outyield either of the main Miller strains, the resultant fibre after machine harvesting is so inferior that it is necessary to restrict their production to farmers who intend to pick by hand.

Cotton Breeding.

Refinement by selection of the jassid resistant backcross Miller strains was continued. Plantings of the most promising progeny increases were made for seed multiplication.

Selection work was commenced in an American upland variety, Ca122, bred for stormproof qualities for mechanical harvesting.

Insecticide Trial.

An irrigated cotton entomological trial was laid down as a 5 × 5 Latin square to compare the effects of two rates of DDT application in both dust and emulsion form on corn ear worm and other insect pests, the treatments being as follows:—

A. 1 lb. DDT per acre emulsion.
B. ½ lb. „ „ „ „
C. 1 lb. „ „ „ dust.
D. ½ lb. „ „ „ „
E. No treatment.

Although a certain amount of loss of squares and young bolls occurred through the season, no significant differences were obtained in this experiment, which produced a mean yield of 509 lb. lint per acre.

Conclusions.

The season under review may be described as moderately favourable for the production of high yields of raingrown cotton but less favourable for irrigated cotton. Had the rains experienced in late December and early January occurred with less intensity, the resultant greater penetration of water would have undoubtedly increased yields of both irrigated and non-irrigated cotton. The season thus highlights the need for practising rotations and cultural methods that increase the trapping of all types of storm rains.

The results obtained indicate also the need for appropriate defoliation of the plants to obtain thoroughly efficient mechanical harvesting. Considerable preliminary tests of defoliants have been conducted in recent seasons and greater emphasis on this factor is planned for the present and future crops.

The entomological position requires complete re-orientation and the appointment of a district entomologist will provide the opportunity of conducting the comprehensive programme of investigations planned for next season.

Received March 1955.

T. BUNCLE AND CO. LTD., ARBROATH.